

# 跨越两个串行物理层异步接口的多链路 PPP

## 目录

[简介](#)

[先决条件](#)

[要求](#)

[使用的组件](#)

[相关产品](#)

[规则](#)

[配置](#)

[网络图](#)

[配置](#)

[验证](#)

[故障排除](#)

[故障排除命令](#)

[相关信息](#)

## 简介

在一些环境中，可能会需要使用聚合带宽将多条异步链路绑定为单一链路。本文档介绍如何配置思科 2500 接入服务器以使用虚拟模板捆绑两个异步接口。

此配置可用于通过异步线路与外置调制解调器连接或使用网络模块（内置调制解调器）的路由器。您可以根据需要向此配置中添加其他功能。

## 先决条件

### 要求

本文档没有任何特定的前提条件。

### 使用的组件

本文档中的信息基于以下软件和硬件版本。

- 实验室环境中清除了配置的思科 2511 和思科 2503 路由器。
- Cisco IOS® 软件版本 12.2(10b) 在这两个路由器上运行。
- 四个外置调制解调器。

本文档中的信息都是基于特定实验室环境中的设备创建的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您是在真实网络上操作，请确保您在使用任何命令前已经了解其潜在影响。

## 相关产品

此配置可用于任意两个各有两个 WAN 串行接口且都能配置异步接口的路由器。可以使用 WIC-1T、WIC-2A/S、8 或 16 异步端口串行接口。

## 规则

有关文档规则的详细信息，请参阅 [Cisco 技术提示规则](#)。

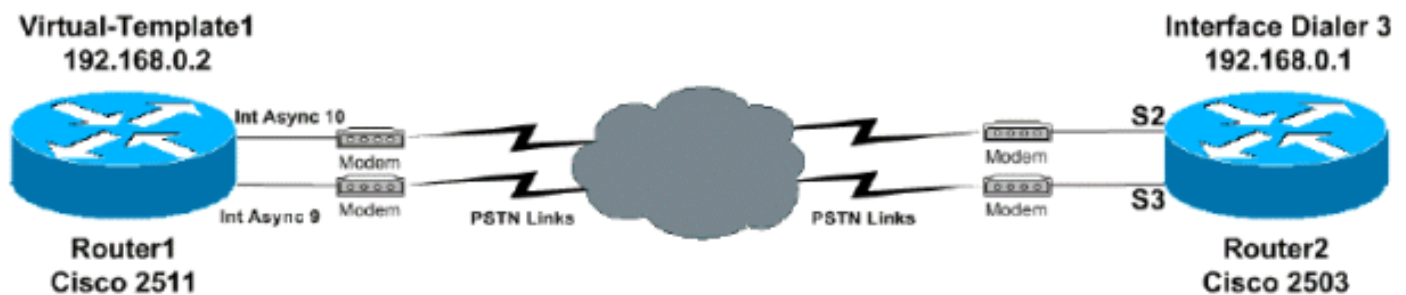
## 配置

本部分提供有关如何配置本文档所述功能的信息。

**注意：**要查找本文档所用命令的其他信息，请使用[命令查找工具](#)（[仅限注册用户](#)）。

## 网络图

本文档使用下图所示的网络设置。



## 配置

本文档使用如下所示的配置。

**注意：**此配置已使用 Cisco IOS 软件版本 12.2(10b) 在思科 2500 系列路由器上进行测试。相同的配置适用于运行 11.0(3) 及更高版本 Cisco IOS 软件的相似路由器拓扑。

### 路由器 1 ( 思科 2511 )

```
Current configuration : 1185 bytes
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
!
hostname Router1
!
username Router2 password 0 xxxxx
ip subnet-zero
!
multilink virtual-template 1
!--- Applies the virtual interface template to the
multilink bundle. ! interface Loopback0 ip address
192.168.0.2 255.255.255.0 ! interface Ethernet0 ip
address 10.0.0.1 255.255.255.0 ! !--- Interface virtual-
```

```

template is a logical interface which creates !---
virtual access interfaces dynamically and applies them
to physical !--- asynchronous interfaces. interface
Virtual-Templat1 ip unnumbered Loopback0 ppp
authentication chap !--- Enables multilink PPP on the
virtual template interface. ppp multilink ! !--- The
parameters configured in interface group-async are !---
applied to the group and range reduces the repeated
configuration !--- in asynchronous interfaces.
interface Group-Async0 ip unnumbered Loopback0
encapsulation ppp async default routing !--- Permits
routing over the async interface. !--- This is required
for a routing protocol to run across the async link.
async mode dedicated !--- Places the line into dedicated
asynchronous network mode. !--- This interface is now
automatically configured for PPP connections. ppp
authentication chap ppp multilink group-range 9 10 !---
Group-range indicates the asynchronous interfaces which
comes under !--- the Group-Async interface. ! router
ospf 1 redistribute connected subnets network
192.168.0.0 0.0.0.255 area 0 ! ip classless ! dialer-
list 1 protocol ip permit ! ! line con 0 line 1 8 flush-
at-activation line 9 10 modem InOut modem autoconfigure
type default transport input all autohangup speed 115200
line 11 16 flush-at-activation line aux 0 line vty 0 4
login ! end

```

## 路由器 2 (Cisco 2503)

```

Current configuration : 1645 bytes
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
!
hostname Router2
!
username Router1 password 0 xxxxx
!--- Username for remote router (Router1) and shared
secret. !--- Shared secret(used for CHAP authentication)
must be the same on both sides. ip subnet-zero ! chat-
script test "" "ATDT\T" TIMEOUT 120 CONNECT \C !--- A
chat script is a string of text that defines the
handshaking that occurs !--- between the router and the
modem to sucessfully handshake with the destination. !--
- In this chat-script called "test" the expected string
"" is !--- the null from the destination. The send
string "ATDT\T" instructs the !--- modem to dial the
telephone number in the dialer string !--- command. This
is 30116 and 30114 in the Interface dialer 3 TIMEOUT 120
CONNECT \C. !--- It waits up to 120 seconds for the
input string "CONNECT". \C is an escape !--- sequence to
end the chat-script. !--- Refer to the Modem-Router
Connection Guide and Chat-script !--- for more
information ! modemcap entry default !--- Modemcap named
"default" will be applied to the line 2 and line 3 of !-
-- Serial interfaces. Refer to the Modem-Router
Connection Guide and !--- modemcap entry for more
information. ! interface Loopback0 ip address
192.168.0.1 255.255.255.0 ! interface Ethernet0 ip
address 172.16.1.1 255.255.255.0 ! ! interface Serial2
physical-layer async no ip address encapsulation ppp
dialer in-band dialer rotary-group 3 !--- Dialer rotary-
group applies the the logical interface dialer 3 !---
configuration to physical serial Interfaces 2 and 3.

```

```

This simplifies the !--- configuration, else the
commands in interface dialer has to be repeatedly !---
configured in physical interfaces. async mode dedicated
! interface Serial3 physical-layer async no ip address
encapsulation ppp dialer in-band dialer rotary-group 3
dialer-group 1 async default routing async mode
dedicated ! interface Dialer3 ! -- This is a logical
interface applied to dialer rotary-group. ip unnumbered
Loopback0 encapsulation ppp dialer in-band dialer idle-
timeout 60 dialer map ip 192.168.0.2 name Router1 modem-
script test broadcast 30116 dialer map ip 192.168.0.2
name Router1 modem-script test broadcast 30114 !---
dialer map statements for the remote router Router1 !---
The name must match the one used by the remote router to
identify itself. !--- use modem chat script "test" for
this connection dialer hold-queue 15 dialer load-
threshold 1 either dialer-group 1 no cdp enable ppp
authentication chap ppp multilink ! router ospf 1
redistribute connected subnets network 192.168.0.0
0.0.0.255 area 0 ! ip classless ! dialer-list 1 protocol
ip permit !--- All IP traffic is defined interesting. !-
-- This is applied to Async interface 2 and 3 using
dialer-group 1. !! line con 0 line 2 3 modem InOut
modem autoconfigure type default !--- Apply the modemcap
"default" (configured previously) to !--- initialize the
modem. Refer to the link Modem-Router Connection Guide
!--- for more information. transport input all !---
Allows all protocols to be passed to the access server
!--- through the line. autohangup !--- Disconnects the
line automatically after the connection closes. speed
115200 line aux 0 line vty 0 4 login ! end

```

要实施此配置，您必须进行以下配置：

- 在路由器 1 上创建一个多链路虚拟模板号码。
- 在这两个路由器上的接口下配置 **ppp 多链路**。
- 在两个路由器的接口下配置身份验证。

在本文档中使用的配置中，路由器 1 配置为仅接听电话，路由器 2 发起通话并连接至路由器 1。两个路由器都进行了多链路 PPP 配置。当连接运行时，系统将创建主捆绑，并且两个异步链路将捆绑在一个虚拟接入接口下。

路由器 1 上的接口 9 和 10 仅接收异步呼叫。当接口 9 和 10 作为 group-async 1 的组成部分时，看不见它们是很正常的。确保创建多链路虚拟模板；否则，第一个信道上也许能进行连接，但是不会传递流量（IP 控制协议 [IPCP] 已关闭）。没有虚拟模板和多链路 PPP 的情况下，此配置可用于一个异步连接，但不能同时用于两个连接。

路由器 2 上的接口 2 和 3 配置了 **physical-layer async** 命令，且会接受多链路 PPP 命令。这些接口变为拨号循环组的一部分时，将被自动移除。输入 **dialer rotary-group 3** 命令之后，**serial ppp multilink** 命令会立即从配置中删除。请改用接口 dialer 3 下的 **ppp multilink** 命令。

## 验证

本部分所提供的信息可用于确认您的配置是否正常工作。

[命令输出解释程序工具](#)（[仅限注册用户](#)）支持某些 **show** 命令，使用此工具可以查看对 **show** 命令输出的分析。

```

Router1#show ip route Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP D
- EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area N1 - OSPF NSSA external type 1, N2
- OSPF NSSA external type 2 E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP i -
IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area * - candidate default, U -
per-user static route, o - ODR P - periodic downloaded static route Gateway of last resort is
not set 172.16.0.0/24 is subnetted, 1 subnets O E2 172.16.1.0 [110/20] via 192.168.0.1,
00:32:54, Virtual-Access1 10.0.0.0/24 is subnetted, 1 subnets C 10.0.0.0 is directly connected,
Ethernet0 192.168.0.0/24 is variably subnetted, 2 subnets, 2 masks C 192.168.0.0/24 is directly
connected, Loopback0 C 192.168.0.1/32 is directly connected, Virtual-Access1 Router1#show ppp
multilink Virtual-Access1, bundle name is Router2 ! --- Virtualized MP bundle. Bundle name is
derived from the username used !--- during authentication Bundle up for 00:34:48 0 lost
fragments, 0 reordered, 0 unassigned 0 discarded, 0 lost received, 1/255 load 0xC8 received
sequence, 0xC8 sent sequence Member links: 2 (max not set, min not set) Async9, since 00:34:52,
last rcvd seq 0000C6 Async10, since 00:32:11, last rcvd seq 0000C7 Router2#show ip route Codes:
C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP D - EIGRP, EX - EIGRP
external, O - OSPF, IA - OSPF inter area N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external
type 2 E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP i - IS-IS, L1 - IS-IS
level-1, L2 - IS-IS level-2, ia - IS-IS inter area * - candidate default, U - per-user static
route, o - ODR P - periodic downloaded static route Gateway of last resort is not set
172.16.0.0/24 is subnetted, 1 subnets C 172.16.1.0 is directly connected, Ethernet0 10.0.0.0/24
is subnetted, 1 subnets O E2 10.0.0.0 [110/20] via 192.168.0.2, 00:45:10, Dialer3 192.168.0.0/24
is variably subnetted, 2 subnets, 2 masks C 192.168.0.0/24 is directly connected, Loopback0 C
192.168.0.2/32 is directly connected, Dialer3 Router2#show ppp multilink Virtual-Access1, bundle
name is Router1 !--- Virtualized MP bundle. Bundle name is derived from the username used !---
during authentication. Bundle up for 00:35:10 Dialer interface is Dialer3 !--- This Virtual
Access Interface used Interface Dialer3. 0 lost fragments, 0 reordered, 0 unassigned 0
discarded, 0 lost received, 1/255 load 0xC9 received sequence, 0xCA sent sequence Member links:
2 (max not set, min not set) Serial3, since 00:35:10, last rcvd seq 0000C8 Serial2, since
00:32:29, last rcvd seq 0000C7 Router1#show caller Active Idle Line User Service Time Time con 0
- TTY 00:12:03 00:00:00 tty 2 - TTY 1d08h 00:00:00 tty 4 - TTY 1d08h 00:00:00 tty 9 Router2
Async 00:43:17 00:00:05 tty 10 Router2 Async 00:40:36 00:00:15 !--- First connection As9 Router2
PPP 00:43:13 - !--- Second connection As10 Router2 PPP 00:40:32 - !--- MP bundle !--- Router2
has two async lines, two TTY, and one virtual interface bundle. Vi1 Router2 PPP Bundle 00:43:10
00:00:05 Router2#show caller Active Idle Line User Service Time Time con 0 - TTY 00:11:36
00:00:00 tty 2 Router1 Async - 00:00:07 tty 3 Router1 Async - 00:00:18 ! --- Second connection
Se2 Router1 PPP 00:39:58 - ! --- First connection Se3 Router1 PPP 00:42:39 - ! --- MP bundle ! -
- Router1 has two async lines, two TTY, and one virtual interface bundle. Vi1 Router1 PPP
Bundle 00:42:39 00:00:01 Router2#show caller user Router1 User: Router1, line tty 2, service
Async Idle time 00:00:16 Timeouts: Absolute Idle Idle Session Exec Limits: - - 00:10:00
Disconnect in: - - - TTY: Line 2, running PPP on Se2 Line: Baud rate (TX/RX) is 115200/115200,
no parity, 2 stopbits, 8 databits Status: Ready, Active, Async Interface Active, Modem Detected
Capabilities: Modem Callout, Modem RI is CD, Line is permanent async interface, Hangup on Last
Close Modem Autoconfigure Modem State: Ready, Modem Configured User: Router1, line tty 3,
service Async Idle time 00:00:08 Timeouts: Absolute Idle Idle Session Exec Limits: - - 00:10:00
Disconnect in: - - - TTY: Line 3, running PPP on Se3 Line: Baud rate (TX/RX) is 115200/115200,
no parity, 2 stopbits, 8 databits Status: Ready, Active, Async Interface Active, Modem Detected
Capabilities: Modem Callout, Modem RI is CD, Line is permanent async interface, Hangup on Last
Close Modem Autoconfigure Modem State: Ready, Modem Configured User: Router1, line Se2, service
PPP Active time 23:14:47, Idle time 00:00:00 Timeouts: Absolute Idle Limits: - - Disconnect in:
- - PPP: LCP Open, multilink Open, CHAP (local <--> local) Dialer: Connected to 30116, outbound
Type is IN-BAND ASYNC, group Di3 Cause: Multilink bundle overloaded IP: Local 192.168.0.1
Bundle: Member of Router1, last input 00:00:01 Counts: 10194 packets input, 769456 bytes, 0 no
buffer 0 input errors, 0 CRC, 0 frame, 0 overrun 10247 packets output, 773761 bytes, 0 underruns
0 output errors, 0 collisions, 31 interface resets User: Router1, line Se3, service PPP Active
time 23:17:30, Idle time 00:00:01 Timeouts: Absolute Idle Limits: - - Disconnect in: - - PPP:
LCP Open, multilink Open, CHAP (local <--> local) Dialer: Connected to 30116, outbound Type is
IN-BAND ASYNC, group Di3 Cause: ip (s=192.168.0.1, d=224.0.0.5) IP: Local 192.168.0.1 Bundle:
Member of Router1, last input 00:00:00 Counts: 10432 packets input, 783562 bytes, 0 no buffer 0
input errors, 0 CRC, 0 frame, 0 overrun 10718 packets output, 799155 bytes, 0 underruns 0 output
errors, 0 collisions, 41 interface resets User: Router1, line Vi1, service PPP Bundle Active
time 23:17:30, Idle time 00:00:05 Timeouts: Absolute Idle Limits: - 00:01:00 Disconnect in: -
00:00:54 !--- Idle-timeout is 60 seconds(1 Minute). PPP: LCP Open, multilink Open, IPCP Dialer:
Connected to 30116, outbound Idle timer 60 secs, idle 6 secs Type is IN-BAND SYNC, group Di3 IP:
Local 192.168.0.1, remote 192.168.0.2 !--- IP address assigned to the bundle !--- and loopback

```

address of the remote router. Bundle: First link of Router1, 2 links, last input 00:00:07  
Counts: 8622 packets input, 623202 bytes, 0 no buffer 0 input errors, 0 CRC, 0 frame, 0 overrun  
8776 packets output, 618523 bytes, 0 underruns 0 output errors, 0 collisions, 0 interface resets  
Router2#show dialer Di3 - dialer type = IN-BAND SYNC NO-PARITY Load threshold for dialing  
additional calls is 1 !--- Load threshold Idle timer (60 secs), Fast idle timer (20 secs) Wait  
for carrier (30 secs), Re-enable (15 secs) Number of active calls = 2 Dial String Successes  
Failures Last DNIS Last status 30114 3 69 00:41:45 successful 30116 4294967293 75 00:44:00  
failed Se2 - dialer type = IN-BAND ASYNC NO-PARITY Rotary group 3, priority 0 !--- Member of  
interface dialer 3 Idle timer (60 secs), Fast idle timer (20 secs) Wait for carrier (30 secs),  
Re-enable (15 secs) Dialer state is multilink member Dial reason: Multilink bundle overloaded !-  
- Interface was not the first link in the MP bundle Connected to 30116 (Router1) !--- Phone  
number that was dialed Se3 - dialer type = IN-BAND ASYNC NO-PARITY Rotary group 3, priority 0 !-  
- Member of interface dialer 3 Idle timer (60 secs), Fast idle timer (20 secs) Wait for carrier  
(30 secs), Re-enable (15 secs) Dialer state is multilink member Dial reason: ip (s=192.168.0.1,  
d=224.0.0.5) !--- Interface was the first link in the bundle, triggered by OSPF ALL !--- Routers  
advt packet. Connected to 30116 (Router1) ! --- Phone number that was dialed

## 故障排除

本部分提供的信息可用于对配置进行故障排除。

以下输出获取自思科 2511 和思科 2503 路由器。输出显示思科 2503 向思科 2511 路由器的 PSTN 链路拨号并建立 MP 连接。

```
Router1#debug ppp negotiation PPP protocol negotiation debugging is on Router1#debug vtemplate
Virtual Template debugging is on Router1#show debug PPP: PPP protocol negotiation debugging is
on VTEMPLATE: Virtual Template debugging is on Oct 1 20:15:20.463: As9 LCP: I CONFREQ [Closed]
id 81 len 39 Oct 1 20:15:20.463: As9 LCP: ACCM 0x000A0000 (0x0206000A0000) Oct 1 20:15:20.467:
As9 LCP: AuthProto CHAP (0x0305C22305) Oct 1 20:15:20.471: As9 LCP: MagicNumber 0x57D7985D
(0x050657D7985D) Oct 1 20:15:20.471: As9 LCP: PFC (0x0702) Oct 1 20:15:20.475: As9 LCP: ACFC
(0x0802) Oct 1 20:15:20.479: As9 LCP: MRRU 1524 (0x110405F4) Oct 1 20:15:20.479: As9 LCP:
EndpointDisc 1 Router2 (0x130A01526F7574657232) Oct 1 20:15:20.483: As9 LCP: Lower layer not up,
Fast Starting Oct 1 20:15:20.487: As9 PPP: Treating connection as a dedicated line Oct 1
20:15:20.487: As9 PPP: Phase is ESTABLISHING, Active Open [0 sess, 0 load] Oct 1 20:15:20.495:
As9 LCP: O CONFREQ [Closed] id 52 len 39 Oct 1 20:15:20.499: As9 LCP: ACCM 0x000A0000
(0x0206000A0000) Oct 1 20:15:20.499: As9 LCP: AuthProto CHAP (0x0305C22305) Oct 1 20:15:20.503:
As9 LCP: MagicNumber 0x078F2456 (0x0506078F2456) Oct 1 20:15:20.507: As9 LCP: PFC (0x0702) Oct 1
20:15:20.507: As9 LCP: ACFC (0x0802) Oct 1 20:15:20.511: As9 LCP: MRRU 1524 (0x110405F4) Oct 1
20:15:20.515: As9 LCP: EndpointDisc 1 Router1 (0x130A01526F7574657231) Oct 1 20:15:20.519: As9
LCP: O CONFACK [ReqSent] id 81 len 39 Oct 1 20:15:20.523: As9 LCP: ACCM 0x000A0000
(0x0206000A0000) Oct 1 20:15:20.527: As9 LCP: AuthProto CHAP (0x0305C22305) Oct 1 20:15:20.527:
As9 LCP: MagicNumber 0x57D7985D (0x050657D7985D) Oct 1 20:15:20.531: As9 LCP: PFC (0x0702) Oct 1
20:15:20.531: As9 LCP: ACFC (0x0802) Oct 1 20:15:20.535: As9 LCP: MRRU 1524 (0x110405F4) Oct 1
20:15:20.539: As9 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232) Oct 1 20:15:20.547:
%LINK-3-UPDOWN: Interface Async9, changed state to up Oct 1 20:15:20.695: As9 LCP: I CONFACK
[ACKSent] id 52 len 39 Oct 1 20:15:20.699: As9 LCP: ACCM 0x000A0000 (0x0206000A0000) Oct 1
20:15:20.703: As9 LCP: AuthProto CHAP (0x0305C22305) Oct 1 20:15:20.707: As9 LCP: MagicNumber
0x078F2456 (0x0506078F2456) Oct 1 20:15:20.707: As9 LCP: PFC (0x0702) Oct 1 20:15:20.711: As9
LCP: ACFC (0x0802) Oct 1 20:15:20.711: As9 LCP: MRRU 1524 (0x110405F4) Oct 1 20:15:20.715: As9
LCP: EndpointDisc 1 Router1 (0x130A01526F7574657231) Oct 1 20:15:20.719: As9 LCP: State is Open
Oct 1 20:15:20.723: As9 PPP: Phase is AUTHENTICATING, by both [0 sess, 0 load] Oct 1
20:15:20.727: As9 CHAP: O CHALLENGE id 45 len 28 from "Router1" Oct 1 20:15:20.739: As9 CHAP: I
CHALLENGE id 40 len 28 from "Router2" Oct 1 20:15:20.743: As9 CHAP: O RESPONSE id 40 len 28 from
"Router1" Oct 1 20:15:20.899: As9 CHAP: I RESPONSE id 45 len 28 from "Router2" Oct 1
20:15:20.903: As9 CHAP: I SUCCESS id 40 len 4 Oct 1 20:15:20.919: As9 CHAP: O SUCCESS id 45 len
4 !--- Call is virtualized after authentication Oct 1 20:15:20.923: As9 PPP: Phase is
VIRTUALIZED [0 sess, 1 load] !--- creation of Virtual access interface 1 Oct 1 20:15:20.935: Vi1
VTEMPLATE: Reuse Vi1, recycle queue size 0 Oct 1 20:15:20.939: Vi1 VTEMPLATE: Set default
settings with ip unnumbered Oct 1 20:15:21.335: Vi1 VTEMPLATE: Hardware address 0000.0c47.7c6c
Oct 1 20:15:21.335: Vi1 PPP: Phase is DOWN, Setup [0 sess, 1 load] Oct 1 20:15:21.339: Vi1
VTEMPLATE: Has a new cloneblk vtemplate, now it has vtemplate !--- Banner: Cloning is in
progress on virtual access interface 1 Oct 1 20:15:21.347: Vi1 VTEMPLATE: ***** CLONE
```

VACCESS1 \*\*\*\*\* Oct 1 20:15:21.351: **Vil VTEMPLATE: Clone from Virtual-Templatel !--- The following configuration of Virtual-template is cloned to the !--- Virtual-access interface.**  
interface Virtual-Access1 default ip address no ip address encaps ppp ip unnumbered Loopback0 no ip unnumbered Loopback0 ip addr 192.168.0.2 255.255.255.0 no ip add ip unnumbered lo 0 ip add 192.168.0.2 255.255.255.0 ip add 192.168.1.2 255.255.255.0 no ip add ip unnumbered lo 0 end Oct 1 20:15:21.367: As9 IPCP: Packet buffered while building MLP bundle interface Oct 1 20:15:22.319: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async9, changed state to up Oct 1 20:15:23.267: As9 IPCP: Packet buffered while building MLP bundle interface Oct 1 20:15:24.447: Vil VTEMPLATE: Messages from (un)cloning ... 192.168.0.0 overlaps with Loopback0 Oct 1 20:15:24.823: Vil VTEMPLATE: Messages from (un)cloning ... 192.168.0.0 overlaps with Loopback0 Oct 1 20:15:24.835: %LINK-3-UPDOWN: **Interface Virtual-Access1, changed state to up** Oct 1 20:15:24.843: Vil PPP: Treating connection as a dedicated line Oct 1 20:15:24.847: **Vil PPP: Phase is ESTABLISHING, Active Open [0 sess, 1 load]** Oct 1 20:15:24.851: Vil LCP: O CONFREQ [Closed] id 1 len 29 Oct 1 20:15:24.855: Vil LCP: AuthProto CHAP (0x0305C22305) Oct 1 20:15:24.859: Vil LCP: MagicNumber 0x078F3560 (0x0506078F3560) Oct 1 20:15:24.859: Vil LCP: MRRU 1524 (0x110405F4) Oct 1 20:15:24.863: Vil LCP: EndpointDisc 1 Router1 (0x130A01526F7574657231) Oct 1 20:15:24.879: Vil PPP: Phase is UP [0 sess, 1 load] Oct 1 20:15:24.883: Vil IPCP: O CONFREQ [Closed] id 1 len 10 Oct 1 20:15:24.883: Vil IPCP: Address 192.168.0.2 (0x0306C0A80002) **! -- Asynchronous interface 9 is added to the Virtual access interface 1 !--- and the name of the bundle is Router2.** Oct 1 20:15:24.891: **Vil MLP: Added first link As9 to bundle Router2** Oct 1 20:15:24.891: Vil PPP: Pending ncpQ size is 2 Oct 1 20:15:24.895: As9 IPCP: Redirect packet to Vil Oct 1 20:15:24.895: Vil IPCP: I CONFREQ [REQsent] id 1 len 10 Oct 1 20:15:24.899: Vil IPCP: Address 192.168.0.1 (0x0306C0A80001) Oct 1 20:15:24.903: Vil IPCP: O CONFACK [REQsent] id 1 len 10 Oct 1 20:15:24.907: Vil IPCP: Address 192.168.0.1 (0x0306C0A80001) Oct 1 20:15:24.911: As9 IPCP: Redirect packet to Vil Oct 1 20:15:24.915: Vil IPCP: I CONFREQ [ACKsent] id 2 len 10 Oct 1 20:15:24.919: Vil IPCP: Address 192.168.0.1 (0x0306C0A80001) Oct 1 20:15:24.919: Vil IPCP: O CONFACK [ACKsent] id 2 len 10 Oct 1 20:15:24.923: Vil IPCP: Address 192.168.0.1 (0x0306C0A80001) Oct 1 20:15:25.007: Vil IPCP: I CONFACK [ACKsent] id 1 len 10 **!--- IP address of virtual bundle was previously obtained from the loopback !--- interface.** Oct 1 20:15:25.011: Vil IPCP: Address 192.168.0.2 (0x0306C0A80002) Oct 1 20:15:25.015: Vil IPCP: State is Open **!--- Adds route for virtual bundle to routing table to reach the remote router.** Oct 1 20:15:25.039: **Vil IPCP: Install route to 192.168.0.1** Oct 1 20:15:25.947: %LINEPROTO-5-UPDOWN: **Line protocol on Interface Virtual-Access1, changed state to up** Oct 1 20:15:31.199: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.0.1 on Virtual-Access1 from LOADING to FULL, Loading Done Oct 1 20:18:01.439: **As10 LCP: I CONFREQ [Closed] id 61 len 39** Oct 1 20:18:01.443: As10 LCP: ACCM 0x000A0000 (0x0206000A0000) Oct 1 20:18:01.447: As10 LCP: AuthProto CHAP (0x0305C22305) Oct 1 20:18:01.451: As10 LCP: MagicNumber 0x57DA0D94 (0x050657DA0D94) Oct 1 20:18:01.451: As10 LCP: PFC (0x0702) Oct 1 20:18:01.455: As10 LCP: ACFC (0x0802) Oct 1 20:18:01.455: As10 LCP: MRRU 1524 (0x110405F4) Oct 1 20:18:01.459: As10 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232) Oct 1 20:18:01.463: As10 LCP: Lower layer not up, Fast Starting Oct 1 20:18:01.467: As10 PPP: Treating connection as a dedicated line Oct 1 20:18:01.467: As10 PPP: Phase is ESTABLISHING, Active Open [0 sess, 0 load] Oct 1 20:18:01.475: **As10 LCP: O CONFREQ [Closed] id 30 len 39** Oct 1 20:18:01.475: As10 LCP: ACCM 0x000A0000 (0x0206000A0000) Oct 1 20:18:01.479: As10 LCP: AuthProto CHAP (0x0305C22305) Oct 1 20:18:01.483: As10 LCP: MagicNumber 0x0791992D (0x05060791992D) Oct 1 20:18:01.483: As10 LCP: PFC (0x0702) Oct 1 20:18:01.487: As10 LCP: ACFC (0x0802) Oct 1 20:18:01.491: As10 LCP: MRRU 1524 (0x110405F4) Oct 1 20:18:01.491: As10 LCP: EndpointDisc 1 Router1 (0x130A01526F7574657231) Oct 1 20:18:01.499: **As10 LCP: O CONFACK [REQsent] id 61 len 39** Oct 1 20:18:01.503: As10 LCP: ACCM 0x000A0000 (0x0206000A0000) Oct 1 20:18:01.507: As10 LCP: AuthProto CHAP (0x0305C22305) Oct 1 20:18:01.507: As10 LCP: MagicNumber 0x57DA0D94 (0x050657DA0D94) Oct 1 20:18:01.511: As10 LCP: PFC (0x0702) Oct 1 20:18:01.511: As10 LCP: ACFC (0x0802) Oct 1 20:18:01.515: As10 LCP: MRRU 1524 (0x110405F4) Oct 1 20:18:01.519: As10 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232) Oct 1 20:18:01.531: %LINK-3-UPDOWN: Interface Async10, changed state to up Oct 1 20:18:01.703: **As10 LCP: I CONFACK [ACKsent] id 30 len 39** Oct 1 20:18:01.703: As10 LCP: ACCM 0x000A0000 (0x0206000A0000) Oct 1 20:18:01.707: As10 LCP: AuthProto CHAP (0x0305C22305) Oct 1 20:18:01.711: As10 LCP: MagicNumber 0x0791992D (0x05060791992D) Oct 1 20:18:01.715: As10 LCP: PFC (0x0702) Oct 1 20:18:01.715: As10 LCP: ACFC (0x0802) Oct 1 20:18:01.719: As10 LCP: MRRU 1524 (0x110405F4) Oct 1 20:18:01.723: As10 LCP: EndpointDisc 1 Router1 (0x130A01526F7574657231) Oct 1 20:18:01.723: **As10 LCP: State is Open** Oct 1 20:18:01.727: **As10 PPP: Phase is AUTHENTICATING, by both [0 sess, 0 load]** Oct 1 20:18:01.731: **As10 CHAP: O CHALLENGE id 25 len 28 from "Router1"** Oct 1 20:18:01.743: **As10 CHAP: I CHALLENGE id 30 len 28 from "Router2"** Oct 1 20:18:01.755: **As10 CHAP: O RESPONSE id 30 len 28 from "Router1"** Oct 1 20:18:01.851: **As10 CHAP: I RESPONSE id 25 len 28 from "Router2"** Oct 1 20:18:01.867: **As10 CHAP: O SUCCESS id 25 len 4** Oct 1 20:18:01.879: **As10 CHAP: I SUCCESS id 30 len 4** Oct 1 20:18:01.879: **As10 PPP: Phase is VIRTUALIZED [0 sess, 0 load]** Oct 1 20:18:01.891: **Vil MLP: Added link As10 to bundle Router2** Oct 1 20:18:02.899: %LINEPROTO-5-

UPDOWN: Line protocol on Interface Async10, changed state to up Router1# Router2#debug ppp negotiation PPP protocol negotiation debugging is on Router2#debug ppp multilink events Multilink events debugging is on Router2#debug dialer Dial on demand events debugging is on Router2#show debug Dial on demand: Dial on demand events debugging is on PPP: PPP protocol negotiation debugging is on Multilink events debugging is on Oct 2 20:15:07.442: %SYS-5-CONFIG\_I: Configured from console by console Oct 2 20:15:08.038: %LINK-3-UPDOWN: Interface Dialer3, changed state to up Oct 2 20:15:08.046: Se3 DDR: rotor dialout [priority] *!--- Dialing Reason* Oct 2 20:15:08.050: Se3 DDR: Dialing cause ip (s=192.168.0.1, d=224.0.0.5) *!--- Number being dialed* Oct 2 20:15:08.054: **Se3 DDR: Attempting to dial 30116** Oct 2 20:15:08.058: CHAT3: Attempting async line dialer script *!--- Using chat script "test" for dialout* Oct 2 20:15:08.058: CHAT3: Dialing using Modem script: test & System script: none Oct 2 20:15:08.066: CHAT3: process started Oct 2 20:15:08.070: CHAT3: Asserting DTR Oct 2 20:15:08.070: CHAT3: Chat script test started *!--- Call being established; note the time elapsed for call setup.* Oct 2 20:15:35.814: CHAT3: Chat script test finished, status = Success Oct 2 20:15:35.830: Di3 IPCP: Install route to 192.168.0.2 *! -- Physical Layer (Serial Interface) is up. !--- Only now can PPP negotiation begin.* Oct 2 20:15:37.818: %LINK-3-UPDOWN: **Interface Serial3, changed state to up** Oct 2 20:15:37.822: Se3 DDR: Dialer statechange to up Oct 2 20:15:37.822: Se3 DDR: Dialer call has been placed *!--- PPP negotiation begins* Oct 2 20:15:37.826: Se3 PPP: Treating connection as a callout *!--- PPP Phase is ESTABLISHING. LCP negotiation will now occur* Oct 2 20:15:37.826: Se3 PPP: Phase is ESTABLISHING, Active Open [0 sess, 0 load] *!--- Outgoing CONFREQ with Field ID 81* Oct 2 20:15:37.834: Se3 LCP: **O CONFREQ [Closed] id 81 len 39** Oct 2 20:15:37.838: Se3 LCP: ACCM 0x000A0000 (0x0206000A0000) *!--- This router is requesting: ! -- Option: Authentication Protocol, Value: CHAP ! -- Option: MagicNumber (used to detect loopbacks and is always sent)* Oct 2 20:15:37.838: **Se3 LCP: AuthProto CHAP (0x0305C22305)** Oct 2 20:15:37.842: **Se3 LCP: MagicNumber 0x57D7985D (0x050657D7985D)** Oct 2 20:15:37.846: Se3 LCP: PFC (0x0702) Oct 2 20:15:37.846: Se3 LCP: ACFC (0x0802) *! -- Negotiate Maximum Receive Reconstructed Unit (MRRU) ! -- MRRU is the maximum packet size this end will reconstruct* Oct 2 20:15:37.850: Se3 LCP: MRRU 1524 (0x110405F4) Oct 2 20:15:37.854: Se3 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232) *! -- Incoming CONFREQ. ID field is 52* Oct 2 20:15:38.162: Se3 LCP: I CONFREQ [REQsent] id 52 len 39 Oct 2 20:15:38.166: Se3 LCP: ACCM 0x000A0000 (0x0206000A0000) *! -- The peer has requested: ! -- Option: Authentication Protocol, Value: CHAP ! -- Option: MagicNumber (used to detect loopbacks and is always sent)* Oct 2 20:15:38.166: Se3 LCP: AuthProto CHAP (0x0305C22305) Oct 2 20:15:38.170: Se3 LCP: MagicNumber 0x078F2456 (0x0506078F2456) Oct 2 20:15:38.174: Se3 LCP: PFC (0x0702) Oct 2 20:15:38.174: Se3 LCP: ACFC (0x0802) Oct 2 20:15:38.178: Se3 LCP: MRRU 1524 (0x110405F4) Oct 2 20:15:38.182: Se3 LCP: EndpointDisc 1 Router1 (0x130A01526F7574657231) *! -- Outgoing CONFACK for message with Field ID 52* Oct 2 20:15:38.186: **Se3 LCP: O CONFACK [REQsent] id 52 len 39** Oct 2 20:15:38.190: Se3 LCP: ACCM 0x000A0000 (0x0206000A0000) Oct 2 20:15:38.194: **Se3 LCP: AuthProto CHAP (0x0305C22305)** Oct 2 20:15:38.198: **Se3 LCP: MagicNumber 0x078F2456 (0x0506078F2456)** Oct 2 20:15:38.198: Se3 LCP: PFC (0x0702) Oct 2 20:15:38.202: Se3 LCP: ACFC (0x0802) Oct 2 20:15:38.202: Se3 LCP: MRRU 1524 (0x110405F4) Oct 2 20:15:38.206: Se3 LCP: EndpointDisc 1 Router1 (0x130A01526F7574657231) *! -- Incoming CONFACK for message with Field ID 81* Oct 2 20:15:38.214: Se3 LCP: I CONFACK [ACKsent] id 81 len 39 Oct 2 20:15:38.214: Se3 LCP: ACCM 0x000A0000 (0x0206000A0000) Oct 2 20:15:38.218: **Se3 LCP: AuthProto CHAP (0x0305C22305)** Oct 2 20:15:38.222: **Se3 LCP: MagicNumber 0x57D7985D (0x050657D7985D)** Oct 2 20:15:38.222: Se3 LCP: PFC (0x0702) Oct 2 20:15:38.226: Se3 LCP: ACFC (0x0802) *! -- Both sides have CONFACKed the parameters ! -- MRRU of 1524 bytes and the Endpoint Discriminator have been negotiated* Oct 2 20:15:38.230: Se3 LCP: MRRU 1524 (0x110405F4) Oct 2 20:15:38.230: Se3 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232) *! -- LCP negotiation complete and LCP state goes to Open* Oct 2 20:15:38.234: **Se3 LCP: State is Open ! -- PPP Phase is AUTHENTICATING. PPP Authentication occurs now ! -- Two-way authentication will be performed (indicated by the both keyword) Oct 2 20:15:38.238: Se3 PPP: Phase is AUTHENTICATING, by both [0 sess, 0 load] *! -- Outgoing CHAP Challenge. ! -- In LCP we had agreed upon CHAP as the authentication protocol* Oct 2 20:15:38.238: Se3 CHAP: O CHALLENGE id 40 len 28 from "Router2" *! -- Incoming Challenge from peer* Oct 2 20:15:38.398: Se3 CHAP: I CHALLENGE id 45 len 28 from "Router1" *! -- Incoming response from peer* Oct 2 20:15:38.402: Se3 CHAP: I RESPONSE id 40 len 28 from "Router1" *! -- Outgoing Response* Oct 2 20:15:38.410: Se3 CHAP: O RESPONSE id 45 len 28 from "Router2" *! -- CHAP authentication successful* Oct 2 20:15:38.418: Se3 CHAP: O SUCCESS id 40 len 4 Oct 2 20:15:38.538: Se3 CHAP: I SUCCESS id 45 len 4 Oct 2 20:15:38.542: Se3 MLP: Request add link to bundle *! -- Virtualize Se3 ! -- Virtual Access interface will represent the MP bundle* Oct 2 20:15:38.542: Se3 PPP: Phase is VIRTUALIZED [0 sess, 1 load] Oct 2 20:15:38.546: Se3 MLP: Adding link to bundle Oct 2 20:15:38.550: Vil PPP: Phase is DOWN, Setup [0 sess, 0 load] Oct 2 20:15:38.558: Vil PPP: No remote authentication for call-out Oct 2 20:15:38.566: Vil MLP: Added to huntgroup Di3 Oct 2 20:15:38.570: Vil MLP: Clone from Di3 Oct 2 20:15:38.574: %LINK-3-UPDOWN: Interface Virtual-Access1, changed state to up Oct 2 20:15:38.578: Vil DDR: Dialer statechange**



to up ! -- Virtual Access Interface is up ! -- Negotiate LCP and PPP parameters for Virtual-Access Interface Oct 2 20:15:38.582: Vi1 DDR: Dialer call has been placed Oct 2 20:15:38.586: Vi1 PPP: Treating connection as a callout Oct 2 20:15:38.586: Vi1 PPP: Phase is ESTABLISHING, Active Open [0 sess, 0 load] Oct 2 20:15:38.594: Vi1 LCP: O CONFREQ [Closed] id 1 len 29 Oct 2 20:15:38.594: Vi1 LCP: AuthProto CHAP (0x0305C22305) Oct 2 20:15:38.598: Vi1 LCP: MagicNumber 0x57D79B57 (0x050657D79B57) Oct 2 20:15:38.602: Vi1 LCP: MRRU 1524 (0x110405F4) Oct 2 20:15:38.606: Vi1 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232) Oct 2 20:15:38.614: Vi1 PPP: Phase is UP [0 sess, 0 load] Oct 2 20:15:38.618: Vi1 IPCP: O CONFREQ [Closed] id 1 len 10 Oct 2 20:15:38.622: Vi1 IPCP: Address 192.168.0.1 (0x0306C0A80001) ! -- First multilink connection is brought up in the virtual access interface Oct 2 20:15:38.626: Vi1 MLP: Added first link Se3 to bundle Router1 Oct 2 20:15:38.630: Di3 IPCP: Remove route to 192.168.0.2 Oct 2 20:15:39.542: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3, changed state to up Oct 2 20:15:39.614: %LINEPROTO-5-UPDOWN: Line protocol on Interface Virtual-Access1, changed state to up Oct 2 20:15:40.614: Vi1 IPCP: TIMEOUT: State REQsent Oct 2 20:15:40.618: Vi1 IPCP: O CONFREQ [REQsent] id 2 len 10 Oct 2 20:15:40.618: Vi1 IPCP: Address 192.168.0.1 (0x0306C0A80001) Oct 2 20:15:41.046: Vi1 MLP: Load (1) above threshold in bundle Router1 Oct 2 20:15:41.046: Se2 DDR: rotor dialout [priority] Oct 2 20:15:41.050: Se2 DDR: Attempting to dial 30116 Oct 2 20:15:41.054: CHAT2: Attempting async line dialer script Oct 2 20:15:41.054: CHAT2: Dialing using Modem script: test & System script: none Oct 2 20:15:41.062: CHAT2: process started Oct 2 20:15:41.066: CHAT2: Asserting DTR Oct 2 20:15:41.066: CHAT2: Chat script test started Oct 2 20:15:42.506: Vi1 IPCP: I CONFREQ [REQsent] id 1 len 10 Oct 2 20:15:42.510: Vi1 IPCP: Address 192.168.0.2 (0x0306C0A80002) Oct 2 20:15:42.514: Vi1 IPCP: O CONFACK [REQsent] id 1 len 10 Oct 2 20:15:42.518: Vi1 IPCP: Address 192.168.0.2 (0x0306C0A80002) Oct 2 20:15:42.530: Vi1 IPCP: I CONFACK [ACKsent] id 1 len 10 Oct 2 20:15:42.534: Vi1 IPCP: Address 192.168.0.1 (0x0306C0A80001) Oct 2 20:15:42.538: Vi1 IPCP: ID 1 didn't match 2, discarding packet Oct 2 20:15:42.546: Vi1 IPCP: I CONFACK [ACKsent] id 2 len 10 Oct 2 20:15:42.550: Vi1 IPCP: Address 192.168.0.1 (0x0306C0A80001) Oct 2 20:15:42.554: Vi1 IPCP: State is Open Oct 2 20:15:42.562: Vi1 DDR: dialer protocol up Oct 2 20:15:42.570: Vi1 DDR: Call connected, 4 packets unqueued, 4 transmitted 0 discarded ! -- Adds route for virtual bundle to routing table to reach the remote router Oct 2 20:15:42.582: Di3 IPCP: Install route to 192.168.0.2 Oct 2 20:15:48.714: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.0.2 on Dialer3 from LOADING to FULL, Loading Done Oct 2 20:17:41.070: CHAT2: Chat script test finished, status = Connection timed out; remote host not responding Oct 2 20:17:41.074: Se2 DDR: disconnecting call Oct 2 20:17:56.074: Se2 DDR: re-enable timeout Oct 2 20:17:56.074: Se2 DDR: Attempting to dial 30114 Oct 2 20:17:56.078: CHAT2: Attempting async line dialer script Oct 2 20:17:56.078: CHAT2: Dialing using Modem script: test & System script: none Oct 2 20:17:56.086: CHAT2: process started Oct 2 20:17:56.090: CHAT2: Asserting DTR Oct 2 20:17:56.090: CHAT2: Chat script test started ! -- Call is being established; note the time elapsed for call setup Oct 2 20:18:16.890: CHAT2: Chat script test finished, status = Success Oct 2 20:18:18.894: %LINK-3-UPDOWN: Interface Serial2, changed state to up Oct 2 20:18:18.898: Se2 DDR: Dialer statechange to up Oct 2 20:18:18.898: Se2 DDR: Dialer call has been placed ! -- PPP negotiation begins Oct 2 20:18:18.902: Se2 PPP: Treating connection as a callout Oct 2 20:18:18.906: Se2 PPP: Phase is ESTABLISHING, Active Open [0 sess, 0 load] ! -- LCP negotiation begins; Multilink parameters are also negotiated Oct 2 20:18:18.910: Se2 LCP: O CONFREQ [Closed] id 61 len 39 Oct 2 20:18:18.914: Se2 LCP: ACCM 0x000A0000 (0x0206000A0000) Oct 2 20:18:18.918: Se2 LCP: AuthProto CHAP (0x0305C22305) Oct 2 20:18:18.918: Se2 LCP: MagicNumber 0x57DA0D94 (0x050657DA0D94) Oct 2 20:18:18.922: Se2 LCP: PFC (0x0702) Oct 2 20:18:18.926: Se2 LCP: ACFC (0x0802) ! -- Negotiate Maximum Receive Reconstructed Unit (MRRU) ! -- MRRU is the maximum packet size this end will reconstruct Oct 2 20:18:18.926: Se2 LCP: MRRU 1524 (0x110405F4) Oct 2 20:18:18.930: Se2 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232) Oct 2 20:18:19.142: Se2 LCP: I CONFREQ [REQsent] id 30 len 39 Oct 2 20:18:19.146: Se2 LCP: ACCM 0x000A0000 (0x0206000A0000) Oct 2 20:18:19.146: Se2 LCP: AuthProto CHAP (0x0305C22305) Oct 2 20:18:19.150: Se2 LCP: MagicNumber 0x0791992D (0x05060791992D) Oct 2 20:18:19.154: Se2 LCP: PFC (0x0702) Oct 2 20:18:19.154: Se2 LCP: ACFC (0x0802) Oct 2 20:18:19.158: Se2 LCP: MRRU 1524 (0x110405F4) Oct 2 20:18:19.162: Se2 LCP: EndpointDisc 1 Router1 (0x130A01526F7574657231) Oct 2 20:18:19.166: Se2 LCP: O CONFACK [REQsent] id 30 len 39 Oct 2 20:18:19.170: Se2 LCP: ACCM 0x000A0000 (0x0206000A0000) Oct 2 20:18:19.174: Se2 LCP: AuthProto CHAP (0x0305C22305) Oct 2 20:18:19.174: Se2 LCP: MagicNumber 0x0791992D (0x05060791992D) Oct 2 20:18:19.178: Se2 LCP: PFC (0x0702) Oct 2 20:18:19.178: Se2 LCP: ACFC (0x0802) Oct 2 20:18:19.182: Se2 LCP: MRRU 1524 (0x110405F4) Oct 2 20:18:19.186: Se2 LCP: EndpointDisc 1 Router1 (0x130A01526F7574657231) Oct 2 20:18:19.194: Se2 LCP: I CONFACK [ACKsent] id 61 len 39 Oct 2 20:18:19.198: Se2 LCP: ACCM 0x000A0000 (0x0206000A0000) Oct 2 20:18:19.198: Se2 LCP: AuthProto CHAP (0x0305C22305) Oct 2 20:18:19.202: Se2 LCP: MagicNumber 0x57DA0D94 (0x050657DA0D94) Oct 2 20:18:19.206: Se2 LCP: PFC (0x0702) Oct 2 20:18:19.206: Se2 LCP: ACFC (0x0802) Oct 2 20:18:19.210: Se2 LCP: MRRU 1524 (0x110405F4) Oct 2 20:18:19.214: Se2 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232) Oct 2 20:18:19.214: Se2

```
LCP: State is Open Oct 2 20:18:19.218: Se2 PPP: Phase is AUTHENTICATING, by both [0 sess, 0 load] Oct 2 20:18:19.222: Se2 CHAP: O CHALLENGE id 30 len 28 from "Router2" Oct 2 20:18:19.358: Se2 CHAP: I CHALLENGE id 25 len 28 from "Router1" Oct 2 20:18:19.362: Se2 CHAP: O RESPONSE id 25 len 28 from "Router2" Oct 2 20:18:19.382: Se2 CHAP: I RESPONSE id 30 len 28 from "Router1" Oct 2 20:18:19.390: Se2 CHAP: O SUCCESS id 30 len 4 Oct 2 20:18:19.482: Se2 CHAP: I SUCCESS id 25 len 4 Oct 2 20:18:19.486: Se2 MLP: Request add link to bundle Oct 2 20:18:19.486: Se2 PPP: Phase is VIRTUALIZED [0 sess, 0 load] !--- Virtualize Se2 !--- Virtual Access interface will represent the MP bundle Oct 2 20:18:19.490: Se2 MLP: Adding link to bundle !--- Second multilink connection is virtualized and added to Virtual !--- access interface. Oct 2 20:18:19.494: Se2 IPCP: Route to 192.168.0.2 still needed by Vi1 Oct 2 20:18:19.498: DDR: MLP bundle, 0 packets unqueued and discarded Oct 2 20:18:19.498: Vi1 MLP: Added link Se2 to bundle Router1 Oct 2 20:18:20.482: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2, changed state to up
```

## [故障排除命令](#)

[命令输出解释程序工具](#) ( [仅限注册用户](#) ) 支持某些 **show** 命令，使用此工具可以查看对 **show** 命令输出的分析。

**注意：** 在发出 **debug** 命令之前，请参阅[有关 Debug 命令的重要信息](#)。

- **debug ppp negotiation** - 用于查看客户端是否正在传递 PPP 协商；此命令用于检查地址协商。
- **debug ppp authentication** - 看见客户端是否可以是否通过认证。如果您使用的是 11.2 之前的 Cisco IOS 软件版本，请改用 **debug ppp chap** 命令。
- **debug ppp error** - 显示和PPP连接协商与操作相关的协议错误以及统计错误。
- **debug vtemplate** - 用于显示虚拟模板克隆以形成虚拟访问接口。
- **debug ppp multilink events** - 用于查看 PPP 多链路事件调试。显示与影响多链路组的事件有关的信息。
- **debug dialer** - 用于显示关于拨号接口上接收的数据包的调试信息。
- **show caller** - 显示连接的统计或调试信息。
- **show dialer** - 显示为DDR配置的接口的一般诊断信息。
- **show caller user** - 显示关于哪个用户在使用哪个调制解调器端口的列表。
- **show ppp multilink** - 用于查看多链路捆绑的成员。

## [相关信息](#)

- [对基本拨号接入进行NAS配置](#)
- [配置旧版 DDR 集线器](#)
- [显示呼叫方统计信息](#)
- [多链路PPP RFC 1717 多链路PPP RFC 1717](#)
- [配置带有拨号配置文件的点到点DDR](#)
- [接入技术支持页面](#)
- [技术支持 - Cisco Systems](#)